

Mulkey-Monache Grazing Allotments, Golden Trout Wilderness
Head Cut and Photo Point Monitoring, 2003 and 2011 (DRAFT)

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Introduction

Baseline monitoring sites were created in summer 2003 within the Mulkey and Monache grazing allotments to help understand trend of watershed condition at sites experiencing degraded conditions. The allotments have been actively grazed since 2003 and previously. As a result of an appeal of the 2000 Templeton-Whitney Allotments Grazing decision, the Forest was instructed by the Regional Office (Region 5) to conduct monitoring in order to understand rates of recovery over a ten year period in comparative, grazed and un-grazed settings (rested Templeton-Whitney Allotments and active Mulkey-Monache) and at a later date analyze the allotments to determine how future grazing will be managed. The monitoring is focused on active head cuts, treated head cuts and degraded sites (unstable riparian and soil conditions) in key area watersheds of the allotments to observe change. Head cuts are defined as the top of an actively eroding stream channel or gully of various sizes that result in gully formation or incision below and migration is caused by stream flow of various amounts and intensity over time, as dictated by hydrologic processes, storm events and site conditions.

Head cut (HC) sites were set up with fixed monuments and initial measurements to monitor and quantify over time the amount of upstream migration and effects to channel morphology and stability, to have an estimate of soil loss or downstream sedimentation and to observe changes to riparian vegetation or otherwise. Treated head cuts (THC), sites where previous attempts were made to arrest head cut migration were set as photo-point monitoring sites to make visual, qualitative observations and to understand treatment effectiveness in various hydrologic/environmental settings. Photo-points (PP) were also established with markers and tags at various erosional features, degraded unstable sites such as stream banks, gullies, and open riparian meadow sites within the representative monitoring areas.

A portion of previously created photo-points within the monitoring areas (circa 1991, La Barbara) were repeated in 2003 and 2011 to give a broader range of perspective where available. Each monitoring site was given an alpha-numeric identity number (i.e., HC-371, THC-367, and PP-370) and corresponding tag at the site, mapped, photographed and initial written observations and measurements were made. The following report displays comparative photographs from 2003 and 2011 along with narratives of findings of the monitoring as compared to initial baseline conditions in 2003.

Monitoring Areas

Monitoring sites were established in the following areas within the allotments.

Mulkey Allotment: Mulkey Meadow, Bullfrog Meadow, Bear Meadow and Overholster Meadow. Monache Allotment: Redrock Meadow and Cold Meadow. Within another document (*Mulkey Monache Allotments Headcut Photo Point Monitoring Summary*) the monitoring areas and sites are discussed and summarized individually per allotment showing monitoring results of the head cut sites, treated head cut sites and photo-point sites along with other observations. Data from each head cut monitoring site is found on a table with 2003 and 2010 findings to show changes along with additional site information as well. The following displays comparative photos and narratives from the 2003 and 2011 monitoring.

MULKEY ALLOTMENT

Bullfrog Meadow Sites



Above photo: Photo-point 366 (PP-366), lower Bullfrog Meadow, August 2003. Site is a degraded terrace bank and edge of riparian wet meadow above historically incised channel (Bullfrog Creek) with actively eroding soil and sod layer. Overland flow from the wet meadow can move over the terrace edge at times. **Below photo:** PP-366 photo re-taken August 2011. The terrace face is still in a state of active erosion and soil loss is occurring, although slightly less than in 2003. Increased riparian vegetation has moved upslope on bare soil area and is starting to fill in and stabilize channel banks. Overall, there is a slight to moderate upward trend at this site. Wetland riparian vegetation has increased in vigor on the area above the eroded terrace edge. Off-site soil movement has lessened.



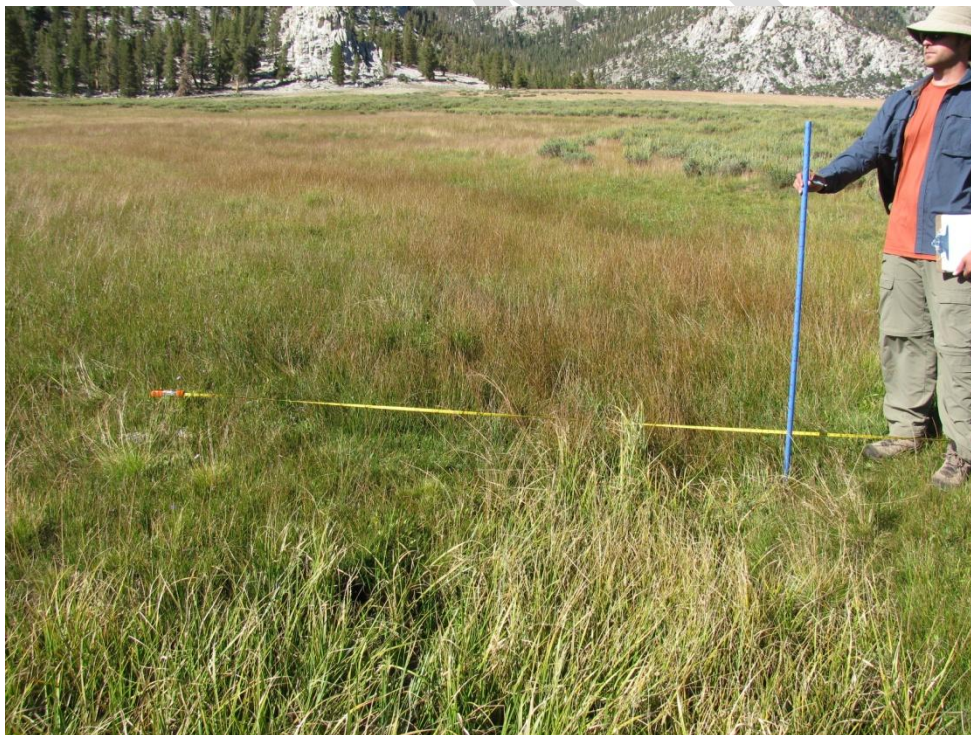
Above photo: Photo-point 368 (PP-368) Bullfrog Meadow, August 2003. Site is a wetland area (possible fen) exhibiting signs of overgrazing, wide spread hummock formation with soil compacted trailing pathways and fragmented organic sod layer. **Below photo:** PP-368 Bullfrog Meadow with photo re-taken August 2011. A noticeable amount of recovery at this site occurred since 2003. Hummock formations have lessened in size and scale, organic soil cover has improved considerably and the local water table is now on the surface in the meadow.



Above photo: Photo Point 367 (PP-367) Bullfrog Meadow, July 2003. PP-367 is a headcut located at the top of the incised gully in lower Bullfrog Meadow that was treated in the early 1990's with filter cloth and rock (rock chute armoring). Bare soil exists around perimeter of incision. **Below photo:** PP-367 with photo re-taken August, 2011. Bare soil shows an increase of vegetative cover and protection since 2003 and rock chute treatment is stable and effective. Gully bottom below rock chute is showing increases of riparian vegetation and appears to show a rise in elevation. Log armoring discourages cattle trampling on banks adjacent to rock chute.



Above photo: Treated Head Cut 367 (THC-367) Bullfrog Meadow, July 2003. THC 367 is a head cut that was treated using filter cloth and rock chute armoring in the early 1990's adjacent to PP-367 (one of two once active headcuts at the top of the incised channel of Bullfrog Creek). **Below photo:** THC-367 Bullfrog Meadow photo re-taken August 2011. Rock chute has become vegetated, filled in with sod and stable, meeting prescription.



Above photo: Photo Point 364 (PP-364) Bullfrog Meadow, July 2003. Site is an active headcut and adjacent eroded banks on tributary of Bullfrog Creek. **Below photo:** PP-364 photo retaken August, 2011. Riparian vegetation has increased and filled in around head cut and banks have stabilized with only a small area of residual exposed soil existing. Site is showing an upward, stable trend. **NOTE:** PP-364 is also known as *Headcut 364* (HC-364). HC -364 has only moved 0.20 meters upstream since 2003 and likely is slowed by increased vegetation and stability at site.



Above photo: Photo Point 365 (PP-365), Bullfrog Meadow photo taken July 2003. The site is an eroded wet meadow area with moderate hummock formations and pockets of exposed, partially eroded organic soil.

Below photo: PP-365 Bullfrog Meadow, photo re-taken August 2011. Hummock formations have lessened in scale and size although still present with less soil exposed. Riparian vegetation has filled in to a large degree over the site helping to stabilize fragile wet soil and the area of exposed soil has been significantly reduced. An upward trend exists at site.

Mulkey and Monache Allotments – 2003 and 2011 Head Cut and Photo Point Monitoring



Above photo: Head cut 364 (HC-364) looking from right bank upstream towards left bank, photo taken July 2003. Extended tape shows location of headcut. Vegetation at the site appears to be less vigorous in 2003. **Below photo:** HC-364 with photo re-taken August 2011. Riparian vegetation has filled and growth increased, adding to overall stability at this site. HC has moved 0.20 meters and under normal conditions should not be a threat for migration.

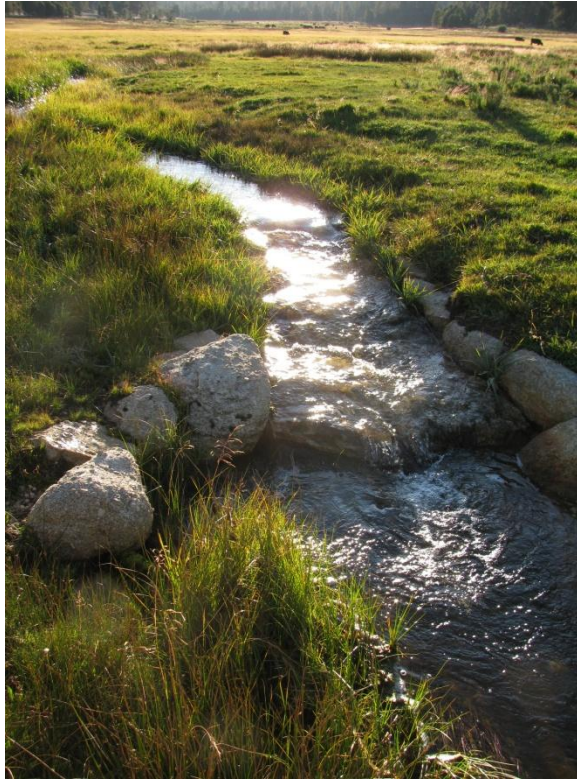


Above photo: Head cut 369 (HC-369), Bullfrog Meadow, July 2003. An active headcut on a low gradient tributary reach to Bullfrog Creek with deep alluvial subsoil (decomposing granite) with a thin organic sod layer thickness. This site is subject alluvial deposition from steep watershed upstream. **Below photo:** HC-369 with photo taken August 2011. Head cut has migrated 7.5 meters, and has formed into two active points. Channel width above HC is narrow as controlled by bank of robust sod above 2003 HC location. HC migration potential is moderate due to low gradient and ability of flood water to spread overland that tends to dissipate flow energy at headcut point(s). This site could be treated for HC stabilization.



Above photo: Spring pool on south bank of Bullfrog Creek, Bullfrog Meadow August 2003. Algae content in pool obvious, floodplain of Bullfrog Creek in background. The banks around the spring pool are moderately impacted by grazing activity. Water quality appears to be adversely affected by nutrient loading. Three adult Mountain yellow legged frogs were seen in pool at this time. **Below photo:** Spring pool at Bullfrog Meadow photo re-taken August 2011. Banks are stable with robust vegetation and water quality appears to be improved, much less algae development. Floodplain vegetation along Bullfrog Creek channel is more robust and appears to be elevating towards terrace. Frogs were not present at this time of observation.

Mulkey and Monache Allotments – 2003 and 2011 Head Cut and Photo Point Monitoring



Above photo: 2010 treated head cut in Bullfrog Creek channel (rock and filter cloth armoring). Treatment maintained effectiveness after high runoff from snow melt and intense summer rain event. **Below photo:** 2010 treated head cut looking down stream, sod banks are growing into structure providing stability.

Mulkey Meadow Sites



Above photo: Photo-point 356 1-A (PP-356-1A), Mulkey Meadow looking east up stream, July 2003. Replicate of La Barbara photo of 1991. Site is a wide meander bend of Mulkey Creek flowing and cutting into a large alluvial deposit. Stream channel is lined with lighter density vegetation and adjacent point bar is mostly bare with recent deposition. **Below photo:** Same site with photo retaken August 2011. Point bar vegetation cover increased, channel has narrowed and established in the bottom, willow growth has increased. Stream appears to not be moving further into bank.



Above photo: Photo-point 356-2A (PP-356-2A), Mulkey Meadow July 2003. Site is a meander bend of Mulkey Creek with abandoned floodplain terrace above channel valley. Vegetation on point bar on south bank has thin vegetative cover and banks on north partially eroded with partial sod missing. Terrace slopes sandy. **Below photo:** Same site with photo retaken August 2011. Point bar on south bank (foreground) has vegetated and stabilized, north banks filled in with vegetation and erosion has slowed on banks, overall an increase in riparian cover. Riparian vegetation extent has increased upwards to terrace slightly. Vegetation on terrace banks is slowly increasing. Site is a repeat of La Barbara 1991 photo.



Above photo: Photo-point 356-1C (PP-356-1C), Mulkey Meadow photo taken August 2003. Site is of a multiple meander bend on Mulkey Creek within an older incised stream bed with adjacent terraces. Point bar in foreground has light vegetative cover and channel banks are partially eroded. **Below photo:** Photo-point 356-1C with photo retaken August 2011. The large point bar in foreground is showing signs of light to moderate vegetative recovery, stream bank erosion has slowed and smaller point bars downstream have fully vegetated, showing moderate increase in channel stability at this site. Site is a repeat of La Barbara 1991 photo.



Above photo: Photo-point 357-1A (PP-357-1A), Mulkey Meadows, August 2003. Site is a mostly straight reach of stream (Mulkey Creek) within an old, incised channel and adjacent terraces with recovering floodplain. Stream channel at this time appears to be over widened (poor width to depth ratio for this stream type). **Below photo:** Same site with photo retaken August 2011. The stream channel is narrowing and stream bank vegetation is more robust, channel is trending closer to normal width to depth ratio. Floodplain vegetation has increased, willow recruitment is occurring along floodplain. Vegetative cover along stream banks has improved. Site is a repeat of La Barbara 1991 photo.



Above photo: Photo taken July 2003, Photo-point 357-2A (PP-357-2A), Mulkey Meadows looking across channel bottom cross section on Mulkey Creek. Sod layer along stream banks is fragmented with bare soil areas. Riparian vegetation density is moderate at site and stream channel is over-widened. **Below photo:** Photo-point 357-2A with photo retaken August 2011. Streamside vegetation has increased and is much denser in coverage, improving hydrologic function. Stream channel has narrowed and banks are stable. Site is a repeat of La Barbara photo 1991.



Above photo: Photo-point 357-1B (PP-357-1B), Mulkey Meadow along Mulkey Creek, August 2003. Site is a straight reach looking along stream side flood plain and channel. Some bank erosion is noticeable in foreground.

Below photo: Same site with photo retaken August 2011, Riparian vegetation along stream channel has increased and stream banks are more stable, willow recruitment is apparent. Slight upward movement of riparian vegetation growth on terrace slopes is noticeable. Site is a repeat of La Barbara 1991 photo.



Above photo: Photo-point 358, (PP-358) Mulkey Meadow along Mulkey Creek photo taken August, 2011. Site is an eroded terrace bank with headcuts in the two lateral gullies that were treated in the 1980's. Terrace banks were contributing sediment to the channel and lower stream banks in an eroding condition with missing, fragmented sod and thinned riparian vegetation. **Below photo:** Same site with photo retaken August 2011. Terrace banks have increased vegetative cover, more in the gullies and streamside vegetation cover has increased, channel is starting to narrow as floodplain vegetation is recovering.

Mulkey and Monache Allotments – 2003 and 2011 Head Cut and Photo Point Monitoring



Above photo: Photo-point 370 (PP-370) Mulkey Meadow, August 2003. Site is an area along Mulkey Creek of widespread, eroded large hummock formations with missing and fragmented sod cover located in a wet meadow area (possible fen). **Below photo:** PP-370 with photo re-taken August 2011. Hummock formations have lessened in shape in scale, erosion has decreased and vegetative cover has increased. Hummocks are present with improved soil protection due to increased riparian vegetation. Site is stabilizing in an upward trend and is still in a delicate condition. Streamside vegetation cover has improved along Mulkey Creek stream banks.



Above photo: Terrace bank along Mulkey Creek (non-photo point) photo taken August 2003. Stratigraphy of bank shows old layers of organics and sandy outwash materials. Terrace top level was possibly where most recent floodplain existed before major channel incision occurred at Mulkey. Point bar on bottom has a wide area of bare ground. **Below photo:** Terrace bank along Mulkey Creek photo retaken August 2011. Terrace slope is more defined with less dry raveling occurring. Point bar is approximately 60 % covered with new vegetation. This area shows there has recently been a high amount of grazing pressure.



Above photo: Gabion check dam built in 1980's on deeply incised but recovering tributary to Mulkey Creek (Cow Camp Creek), August 2003. **Below photo:** Gabion check dam photo re-taken August 2011. Appears recovering floodplain in incision is slowly aggrading. Recent flood in July 2011 has damaged the spillway apron structure and may cause undermining of dam from next large peak flow. Piping of water is occurring beneath the structure.

Mulkey and Monache Allotments – 2003 and 2011 Head Cut and Photo Point Monitoring



Above photo: Headcut 371 (HC-371) Mulkey Meadow on Cow Camp stringer, August 2003. Headcut formed after treatment of original headcut failed and HC resumed migration upstream. **Below photo:** Retake of photo HC-371 August, 2011. HC has migrated slowly (0.52 meters) likely due to resistance of a dense, well-developed sod layer and deep vegetative rooting in rebuilding floodplain above HC that helps to hold fine, organic subsoil. This HC could be retreated and if done correctly would have a high probability of success. Riparian vegetation has shown a slight increase in growth. Headcut face is more eroded and wider than in 2003.



Above photo: Headcut 372 (HC-372) Mulkey Meadow on Cow Camp Stringer, August 2003. Steeply faced HC migrating into recovering floodplain of old incised channel. Deep organic soil exists at site. **Below photo:** HC 372 with photo re-taken August 2011. Scour pool has widened below HC and has caused minor bank erosion below HC. HC migration is slow, 0.72 meters of upstream movement. Similar site condition to HC-371 just downstream from HC-372 where deep organic sod layer and well rooted vegetation holds soil together and is resistant to rapid erosion under normal runoff conditions. Site is a good candidate for HC stabilization work.

Bear Meadow Sites



Above photo: Treated Head Cut 360 (THC-360) Bear Meadow, August 2003. Site is a treated headcut done in the 1990's, a rock and filter cloth armoring. At the time of observation the treatment was stable and within prescription. Some bare soil area existed around the treatment. **Below photo:** THC-360, photo re-taken August 2011. Treatment is fully functional and meeting prescription. Surrounding banks have filled in with vegetation furthering stability of the treatment. Vegetation is developing into the rock chute and holding soil, no need for maintenance.



Above photo: Head Cut 359 (HC-359) Bear Meadow, August 2003 looking across top of headcut (transect tape crosses HC face). Moderate sized gully exists below HC, gully banks show exposed soil along gully edges. **Below photo:** HC 359 Bear meadow with photo re-taken August 2011. HC has migrated 0.60 meters since 2003 a cow skull is seen at the current HC location. Migration is slow due to a resilient, well developed sod layer and strong vegetation rooting into deep organic soil. Gully banks below HC show increased soil erosion and bare soil. Gopher activity noticeable, overall sod layer in meadow appears same, not full. HC has right conditions for stabilization.

Overholster Meadow Sites



Above photo: Photo point 361 (PP-361) Overholster Meadow, August 2003. Site is a stock crossing point on Mulkey Creek with eroded stream banks and missing vegetation along channel. Small back water pool exists in foreground. **Below photo:** PP-361 photo retaken August 2011. Eroded stream banks and channel edge has shown slight to moderate increase of riparian vegetation, unstable bare soil still exists. Overall riparian vegetation is more robust, and backwater pool in foreground has filled in with sediment. Willows are denser. Not a lot of change.

Mulkey and Monache Allotments – 2003 and 2011 Head Cut and Photo Point Monitoring



Above photo: Photo point 362 (PP 362), Overholster Meadow August 2003. Site is an eroded stream bank on outward meander bend on Mulkey Creek with barren terrace slope in background. **Below photo:** PP-362 with photo re-taken August 2011. Stream bank erosion is ongoing and slightly increased from peak flows. Riparian vegetation has increased moderately, mostly with willow development adding to stability. Cover on terrace bank has slightly increased. Point bar in right of photo has slow increase in vegetation cover.

Mulkey and Monache Allotments – 2003 and 2011 Head Cut and Photo Point Monitoring



Above photo: Head Cut 363 (HC-363) north tributary branch of Overholster Meadow August 2003. A large HC located in mineral soil with active erosion. Found in an ephemeral flowing channel with high erosion potential. This HC is at the top of the historic gully on the north branch of Overholster. **Below photo:** HC-363 with photo re-taken August 2011. HC has migrated 2.30 meters and gully below has widened and deepened considerably (see HC data tables). Migration was limited by willow and pine tree roots above that held head cutting in check. Without root slowing, erosion rates could be higher. The HC is a source of sediment to Mulkey Creek. Site is difficult to treat, not recommended for treatment.

Mulkey and Monache Allotments – 2003 and 2011 Head Cut and Photo Point Monitoring



Above photo: North branch of Overholster Meadow, August 2003. Site is a large gully that runs from the gully confluence with Mulkey Creek in Overholster Meadow, caused by historic channel incision from floods and currently stabilized with recovering floodplain in bottom where riparian vegetation is filling in. HC 363 is at the top of this gully ¼ mile upstream. **Below photo:** North branch of Overholster Meadow, photo retaken August 2011. Appears that gully bottom has slightly elevated and vegetation is more robust and developed, and is exhibiting signs of stability.

Mulkey and Monache Allotments – 2003 and 2011 Head Cut and Photo Point Monitoring

MONACHE ALLOTMENT

Redrock Meadows Sites



Above photo: Photo-point 308 (PP-308) Redrock Meadow, June 2003. Site is an area of punctured sod and partially exposed soil on the banks of east branch of Redrock Creek. **Below photo:** PP-308 with photo re-taken September, 2011. Most of the disturbed sod areas have re-vegetated, riparian vegetation is more robust and the site is stable.



Above photo: Photo-point 309 (PP-309) Redrocks Meadow, June 2003. Site is a disturbed and eroded stream bank at the confluence of two stringers, in mid photo. **Below photo:** PP-309, with photo re-taken September 2001. The eroded stream bank is now fully stabilized with new riparian vegetation growth. Stream channel has narrowed and deepened.



Above photo: Photo-point 313-1B (PP-313-1B), Redrocks Meadow June 2003. Site is a stream bank meander with several nick points caused by cattle trailing. Channel is moderately over-widened as a result of bank erosion. Logs and branches were placed by resources crews to discourage cattle trampling. **Below photo:** PP-313-1B with photo re-taken September 2011. All nick points have mostly filled in with organic soil and new vegetation. Logs are now entrained into stream banks adding to stability and channel has moved towards normal width and depth. Riparian vegetation is more robust.



Above photo: Photo-point 313-1A (PP-313 1A) Redrock Meadows, June 2003. Site is a degraded meander bend with bank nick-points along a stringer. **Below photo:** Most of the eroded stream bank has filled in with robust vegetation and is stable, channel has narrowed.



Above photo: Treated Head Cut 311 (THC-311) Redrock Meadow June 2003. Site is an older log structure (check dam) and rock spillway built to arrest head cutting and to capture sediment to build incised channel upward, built in 1950's. Treatment at the time was effective, channel is defining itself. **Below photo:** THC-311 photo re-taken September 2011. Structure is intact and effective, vegetation has taken hold and stream channel has defined a natural course less dependent on the structure. Riparian vegetation behind the log dam has filled in and robust. Site is very stable.

Mulkey and Monache Allotments – 2003 and 2011 Head Cut and Photo Point Monitoring



Above photo: Treated Head Cut 312-1A (THC-312-2a) Redrock Meadow, photo taken June 2003. Site is a channel with a series of small headcuts treated with limbs/branches placed over headcuts to slow erosion and to discourage cattle trampling. Stream bank edges are showing moderate erosion. **Below photo:** THC-312-1A with photo re taken September 2011. Bare soil areas on banks have re-vegetated, the channel has narrowed and woody materials have become structured into the soil and vegetation.



Above photo: Treated Head Cut 312-2A (THC-312-2A), Redrock Meadow photo was taken June 2003. A moderate amount of lateral scouring of stream banks caused by branching in channel has occurred with bare soil showing.

Below photo: THC-312-2A with photo taken September 2011. Raw stream banks have filled in with vegetation and bare soil areas have diminished. Erosion has mostly ceased.



Above photo: Treated Head Cut 312-2B (THC-312-2B) Redrock Meadow with photo taken September 2011. Site is a small head cut treated with wood branching to slow erosion and discourage cattle trampling. **Below photo:** THC-312-2B with photo re-taken September, 2011. Exposed soil areas on stream banks have stabilized with vegetation and erosion has slowed. Vegetation is more robust.

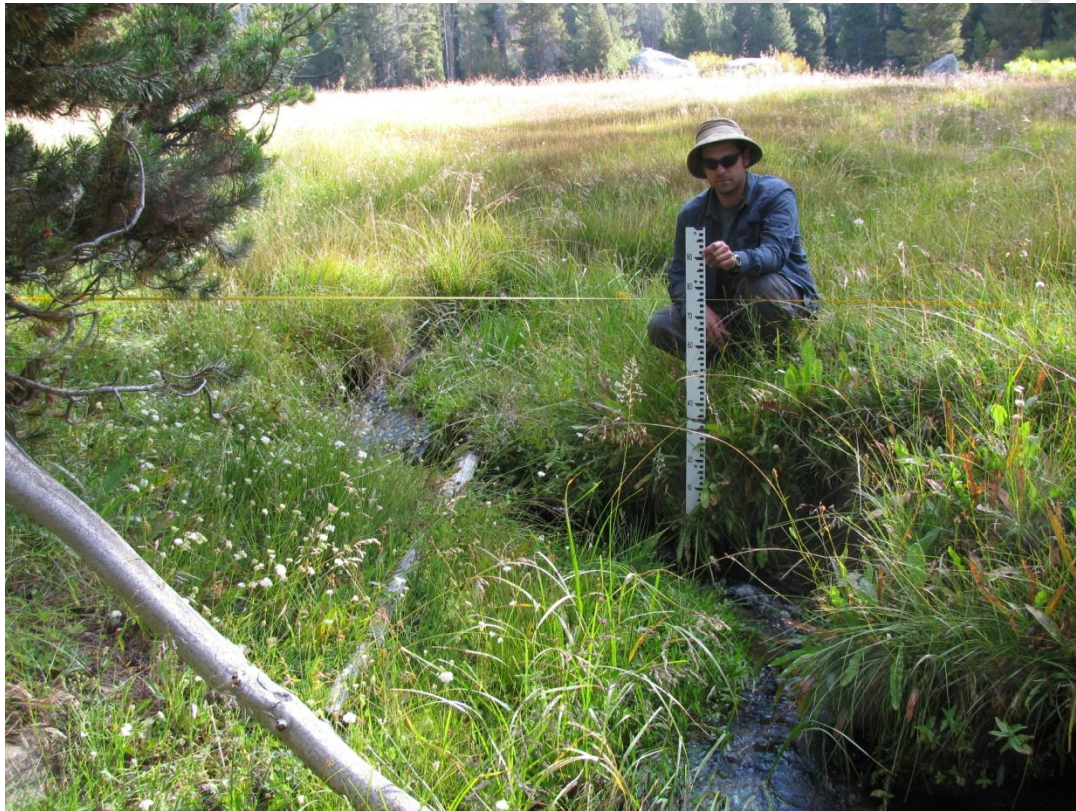


Above photo Treated Head cut 312-3A (THC-312-3A) Redrock Meadow, June 2003. Head cut treated has slowed head cutting, stream banks have over widened and are showing areas of bare soil. **Below photo:** THC-312-3A with photo re taken September, 2011. Stream banks have narrowed and stabilized with robust vegetation and erosion rates are low to normal.

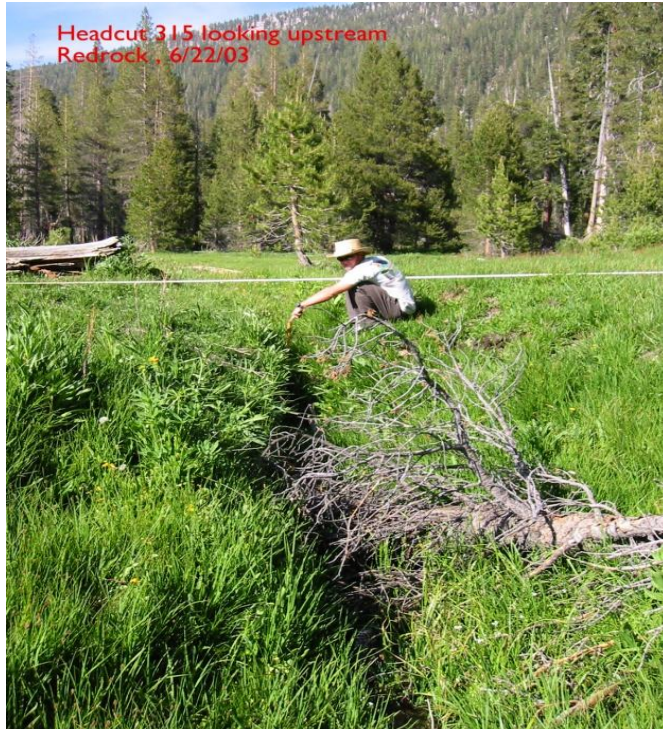


Above photo: Head Cut 310, (HC-310) Redrock Meadow June 2003. The headcut was caused by a failed rock chute treatment of a previous headcut. The headcut was starting to migrate above old structure.

Below photo: HC-310, Redrock Meadow with photo re taken September, 2011. Headcut has not migrated and does not exist as before, vertical HC face has sloped back and adjusted to natural grade and channel has stabilized with robust vegetation. The site has stabilized, no need for treatment.



Above photo: Head Cut 314 (HC-314, Redrock Meadow, June 2003. It is a small headcut in the channel with a steep face. **Below photo:** HC-314 Redrock Meadow with photo re-taken September, 2011. Headcut has not migrated, and no longer exists. Channel has adjusted to natural gradient. No need for future stabilization treatment. Stream banks are very stable at this site.



Above photo: Head Cut 315 (HC-315), Redrock Meadow with photo taken June 2003. The site is a steep headcut with a deep and narrow channel. Banks are mostly stable with well-developed vegetation. **Below photo:** HC-315, Redrock Meadow with photo re taken September 2011. Head cut had migrated only 0.35 meter, indicating a stable site. The headcut has a deep fall (face) and has a higher scour factor but dense, well rooted vegetation along the banks and a cobble dominated stream substrate resist erosion. Likely this HC will not migrate to any severe amount. Site would be very suitable for treatment (low priority) good resources nearby for treatment.

Cold Meadow Sites



Above photo: Photo-point 318 (PP-318), Cold Meadow June 2003. Site is a degraded stream bank used as a cattle trail. **Below photo:** PP 318, Cold Meadow with photo re-taken September 2011. Site has fully recovered in terms of exposed soil and unstable stream bank with robust vegetation.



Above photo: Photo-point 320 (PP-320) Cold Meadow June 2003. Site is a degraded stream bank caused by cattle trailing and sapping seep flow. **Below photo:** PP-320 Cold Meadow with photo re-taken September 2011. Marked improvement on stream bank, Sloughing sod on banks has ceased and has filled in with vegetation and organic soil. Some areas of thin sod are present and vulnerable to trampling.



Above photo: Photo point 322 (PP-322) Cold Meadow June 2003. Site is a degraded stream bank with high amounts of bare soil on bank and missing vegetation. **Below photo:** PP-322 with photo re-taken September 2011. Bare soil areas have diminished in scale. Stream bank vegetation along channel has formed providing channel stability. Bare soil areas still exist on bank and are vulnerable. Vegetation cover on bank has increased approximately 60%.

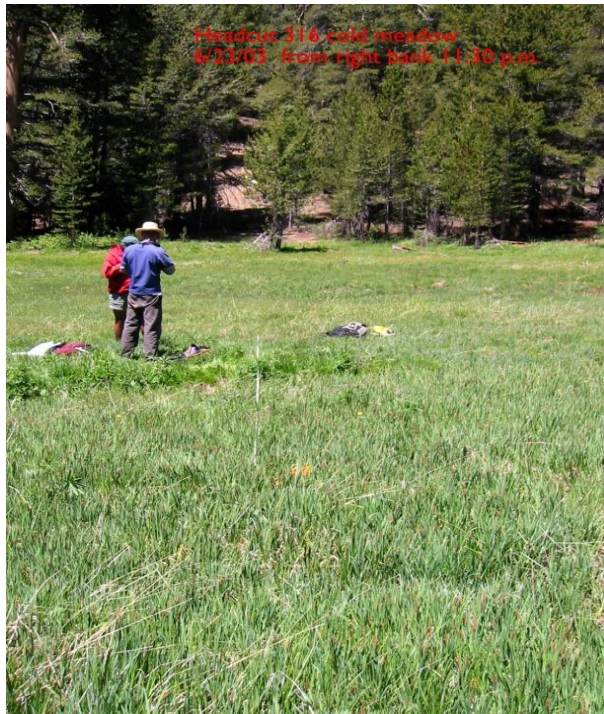
Mulkey and Monache Allotments – 2003 and 2011 Head Cut and Photo Point Monitoring



Above photo: PP-322 with a wider view of the site, Cold Meadow June 2003. Photo shows the large area of disturbance on the stream bank. **Below photo:** PP-322 Cold Meadow with same view re-taken September 2001. Wider view shows high increase of ground cover vegetation since 2003, with some instability existing.



Above photo: Treated Head Cut 321 (THC-321), Cold Meadow with photo taken June 2003. Site is an old gully treatment (log check dam and spillway) built in 1950's. Only the spillway portion is left above the sod surface and treatment is meeting treatment prescription. **Below photo:** THC-321 Cold Meadow with photo re-taken September 2011. Meadow is continuing upward sod development and elevated water table. Flows are still moving across spillway. Eventually the structure will be completely sub-surface and water will not be guided by the structure and will find its natural path. This condition would then meet full treatment objective. No concerns or needs at this site.



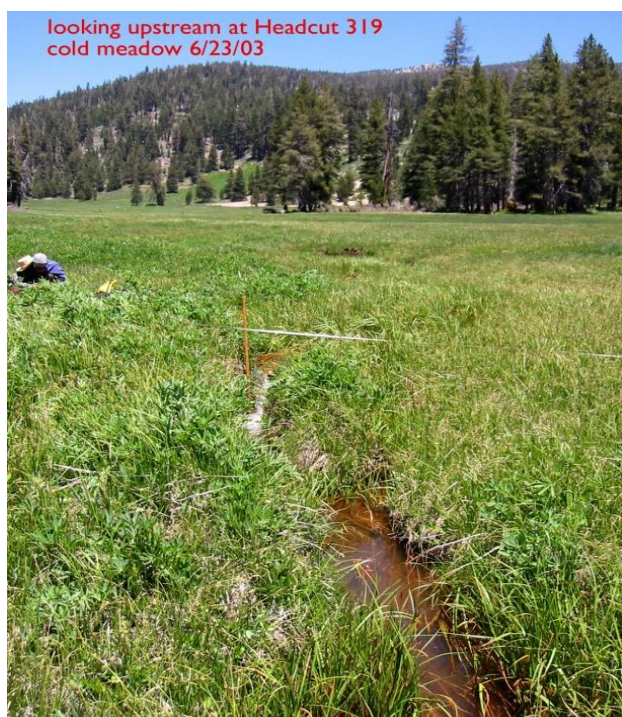
Above photo: Headcut 316 (HC-316) Cold Meadow, June 2003. Site is looking across transect at vegetation.

Below photo: HC-316 with same site photo re-taken September, 2011. Head cut has migrated 5.80 meters since 2003 and channel has not over-widened. HC is deep, erosion is occurring below rooting zone of sod, slope is moderately steep at this site increasing stream flow velocity and may be contributing to high migration rate. Site is suitable for HC treatment is a priority.

Mulkey and Monache Allotments – 2003 and 2011 Head Cut and Photo Point Monitoring



Above photo: Head cut 317 (HC-317) Cold Meadow June 2003. View is looking across transect from right bank to left bank. **Below photo:** HC-317 Cold Meadow with same photo re-taken September, 2011. Head cut has migrated only 0.30 meter, clay type sub soil below "A" horizon and dense vegetation has slowed erosion rates. This site is suitable for HC treatment.



Above photo: Head cut 319 (HC-319) Cold Meadow June 2003. View is looking up channel at head cut and transect in narrow channel. **Below photo:** HC-319 Cold Meadow with photo re-taken September 2011. Due to aggressive vegetative growth at the site the head cut transect monuments could not be relocated (did not have metal detector). Site was estimated referring to 2003 photo to see if migration occurred and an estimated 3.9 meters of migration occurred. Head cut is still active and is suitable for treatment with excellent sod layer and stability at the site.



Above Photo: Photo-point 307-1a, NW portion of Redrocks Meadow, photo taken June 2003. Site is an eroded meadow slope where overland runoff gathers from above and pours over the cut. Soil is exposed with little vegetation showing on the bare area. **Below Photo:** Photo-point 307-1A, upper and west Redrock Meadows photo taken September 2011. Since 2003 monitoring, this site has shown an increase in stability, erosion of scalloped bare soil area has slowed and bare area extent has diminished. Some rilling is evident on bare area in photo indicating some vulnerability. Some slight erosion is still occurring along top of scallop, and robust vegetation is resisting erosion. Files of 2003 monitoring show initial photo.